

- b. Lubricate a new O-ring with oil and install it into the groove in the rocker arm holder (**Figure 8**).
- c. Tighten the cylinder head cover bolts securely in two or three steps and in a crisscross pattern.

ROCKER ARMS, PUSHRODS AND CYLINDER HEAD

The rocker arms, pushrods and cylinder head (**Figure 10**) can be removed with the engine mounted in the frame. Some of the following photographs show the engine removed from the frame for clarity.

Cylinder Head Removal

NOTE

Perform Steps 1-6 if the engine is mounted in the frame.

1. Remove the fuel tank and heat guard (Chapter Eight).
2. Remove the exhaust pipe as described in this chapter.
3. Remove the carburetor (Chapter Eight).
4. Remove the upper engine hanger bolts, bracket bolts and engine hanger (A, **Figure 11**).
5. Remove the bolts, intake manifold and O-ring (B, **Figure 11**).
6. Remove the cylinder head cover as described in this chapter.
7. Remove the timing hole cap (**Figure 12**) and O-ring.
8. Remove the spark plug and ground it against the cylinder head.
9. Position the engine at TDC on its compression stroke as follows:
 - a. Slowly pull the recoil starter and align the flywheel T mark with the index mark on the rear crankcase cover (**Figure 13**).
 - b. Make sure the piston is at TDC on its compression stroke by moving both rocker arms by hand; both rocker arms should have some free play. If both rocker arms are tight, turn the crankshaft one full turn and realign the flywheel T mark with the index mark. Make sure both rocker arms are loose.



10. Remove the cylinder head 6 mm bolts (**Figure 14**).
11. Loosen the cylinder head acorn nuts (A, **Figure 15**) and rocker arm holder bolt (B) in two or three steps following a crisscross pattern. Remove the fasteners and washers.
12. Remove the rocker arm assembly (C, **Figure 15**).
13. Remove the two dowel pins (A, **Figure 16**).

NOTE

*Identify the two pushrods (**Figure 17**) so they can be installed in their original positions.*

14. Remove the two pushrods (B, **Figure 16**).
15. Remove the cylinder head. If the head is stuck, tap the head with a plastic mallet to break it loose.
16. Remove the cylinder head gasket and dowel pins (**Figure 18**).

Rocker Arm Holder Disassembly/Inspection/Reassembly

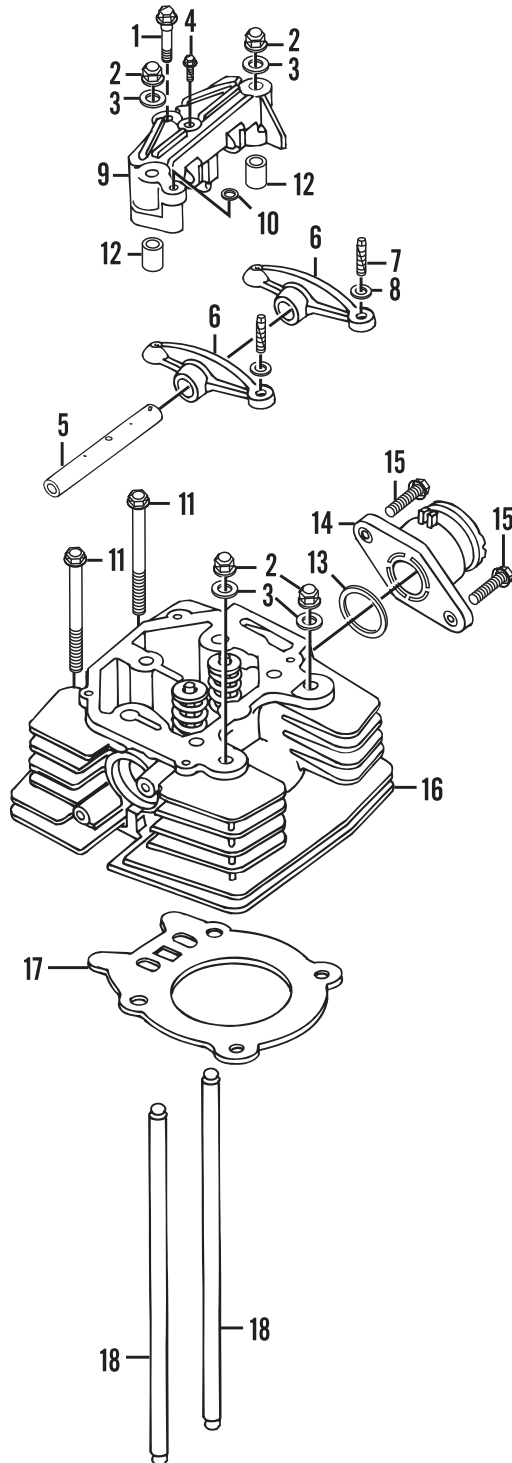
Refer to **Table 2** when measuring the rocker arm components in this section. Replace worn or damaged parts.

NOTE

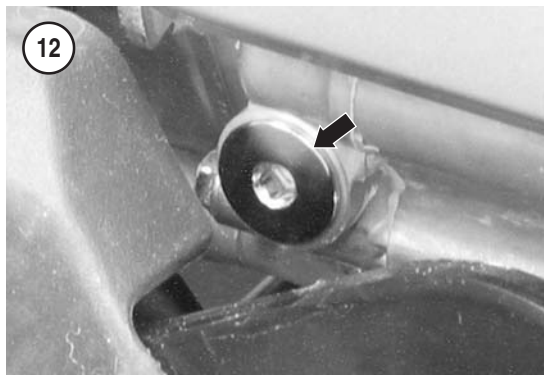
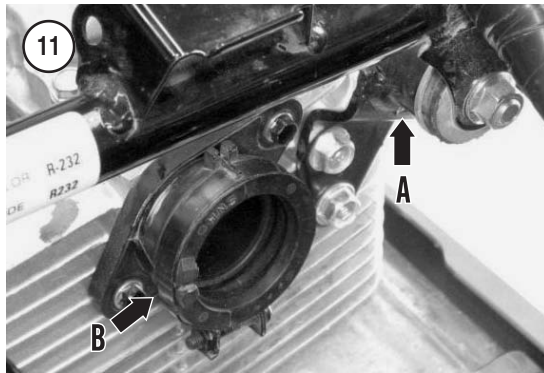
Before removing the rocker arms in Step 1, mark the position of both rocker arms so they can be installed in their original position.

1. Remove the bolt (A, **Figure 19**), rocker arm shaft (B) and both rocker arms (C).
2. Clean and dry the rocker arm holder assembly. Flush all oil passages with compressed air.

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CYLINDER HEAD

- 1. Bolt
- 2. Acorn nut
- 3. Washer
- 4. Bolt
- 5. Rocker shaft
- 6. Rocker arm
- 7. Adjuster
- 8. Nut
- 9. Rocker shaft holder
- 10. O-ring
- 11. Bolt
- 12. Dowel pin
- 13. O-ring
- 14. Intake tube
- 15. Bolt
- 16. Cylinder head
- 17. Head gasket
- 18. Pushrod



3. Inspect the push rod socket on the rocker arm (**Figure 20**). Check for cracks, uneven wear or signs of heat damage.

4. Inspect the valve adjuster pads (**Figure 20**) for flat spots, cracks or other damage. Inspect the locknuts for damage or rounded hex corners.

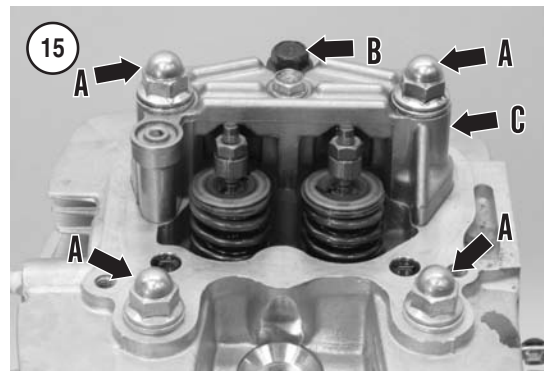
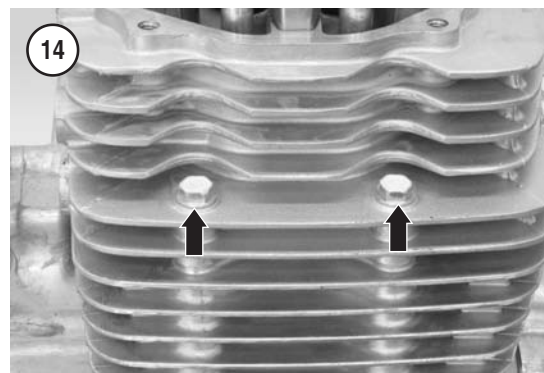
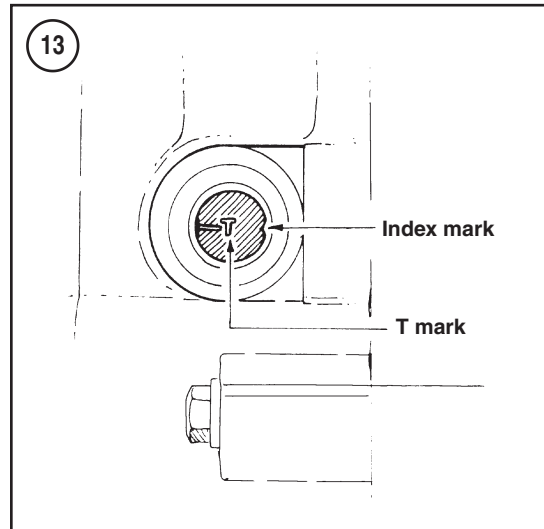
5. Inspect the rocker arm shaft (**Figure 20**) for scoring, cracks or other damage, and replace it if necessary.

6. Measure the rocker arm bore inside diameter (**Figure 20**) with a snap gauge. Measure the snap gauge with a micrometer. If it is within specification, record the dimension and continue with Step 7.

7. Measure the rocker arm shaft outside diameter (**Figure 20**) where both rocker arms ride. If it is within specification, record the dimension and perform Step 8.

8. Calculate the rocker arm-to-rocker arm shaft clearance as follows:

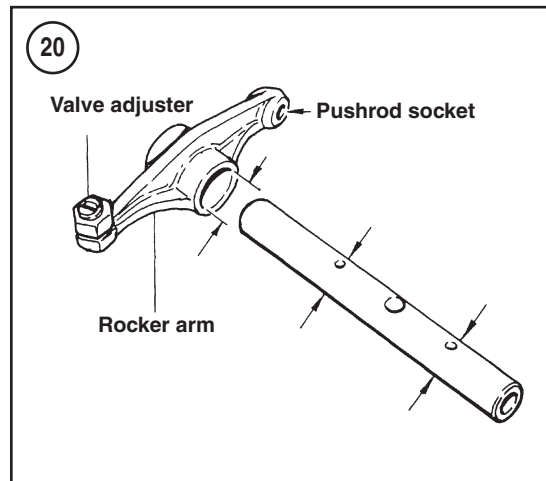
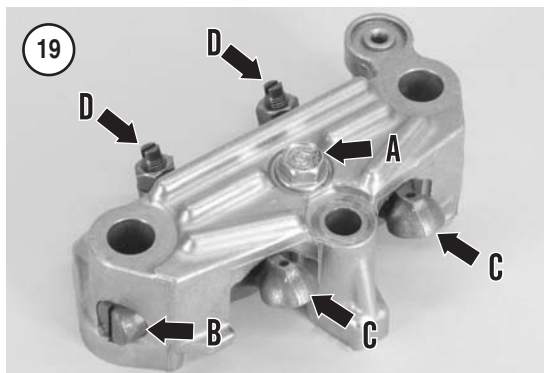
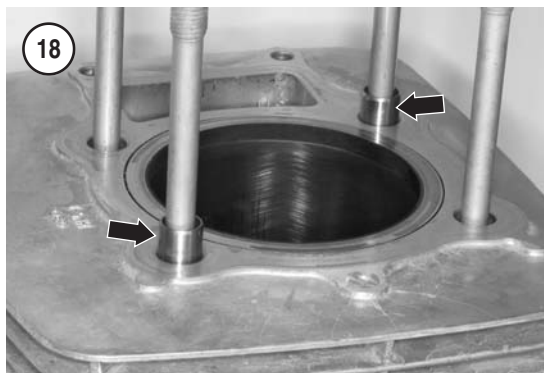
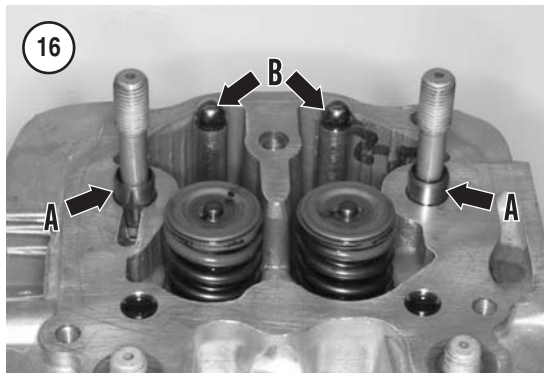
- a. Subtract the rocker arm shaft outside diameter (Step 7) from the rocker arm bore inside diameter (Step 6) to determine rocker arm-to-shaft clearance.
- b. Replace the rocker arms and/or the rocker arm shaft if the clearance is out of specification.



9. Lubricate the rocker arm bores and rocker arm shaft with engine oil.

NOTE

When using the original rocker arms, install them in their original mounting positions.



4

10. Install the rocker arms (C, **Figure 19**) into the rocker arm holder, then install the rocker arm shaft (B) with the screwdriver slot end facing out.

11. Turn the rocker arm shaft to align the hole in the rocker arm shaft with the bolt hole in the rocker arm holder. Install the rocker arm shaft mounting bolt (A, **Figure 19**) and tighten it to 7 N•m (62 in.-lb.).

12. Make sure both rocker arms pivot smoothly on the rocker arm shaft.

Pushrod Inspection

Replace the pushrods (18, **Figure 10**) if they are excessively worn or damaged.

CAUTION

While both pushrods are identical (same part number), used pushrods must be reinstalled in their original mounting positions. When cleaning and inspecting the pushrods, do not remove the identification marks made during removal.

1. Clean and dry the pushrods.
2. Roll each pushrod on a flat surface and check for bending.
3. Check the pushrod ends for uneven wear, cracks or signs of heat damage (discoloration).

Cylinder Head Inspection

1. Remove all gasket residue from the cylinder head gasket surfaces. Do not scratch the gasket surface.
2. Without removing the valves, remove all carbon deposits from the combustion chamber (A, **Figure 21**). Use a fine wire brush dipped in solvent or make a scraper from hardwood. Take care not to damage the head, valves or spark plug threads.

CAUTION

Do not clean the combustion chamber after removing the valves. The valve seat surfaces may be damaged, which may cause poor valve seating.

3. Examine the spark plug threads in the cylinder head for damage. If damage is minor or if the threads are dirty or clogged with carbon, use a spark plug thread tap to clean the threads following the manufacturer's instructions. If thread damage is excessive, restore the threads with a steel thread insert.

CAUTION

Aluminum spark plug hole threads can be damaged by galling, cross-threading and overtightening. To prevent galling, apply an anti-seize compound on the plug threads before installation and do not overtighten.

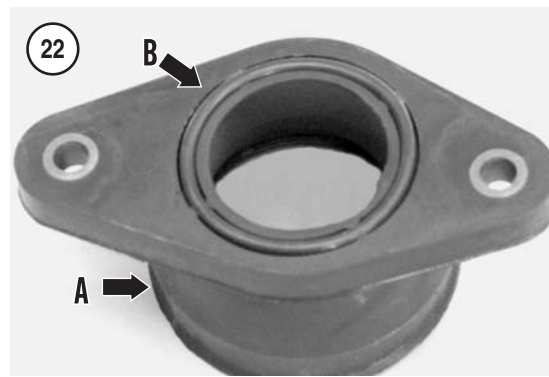
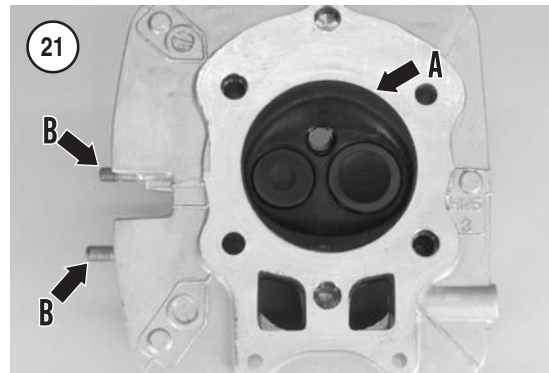
NOTE

When using a tap to clean spark plug threads, coat the tap with an aluminum tap cutting fluid or kerosene.

4. After cleaning the combustion chamber, valve ports and spark plug thread hole, clean the entire head in solvent.

CAUTION

If the cylinder head was bead-blasted, clean the head first with solvent, and then with hot soapy water. Residue grit that seats in small crevices and other areas can be hard to dislodge. Also, chase each exposed thread with a tap to remove grit trapped between the threads. Residue grit left in the engine will cause premature piston, ring and bearing wear.



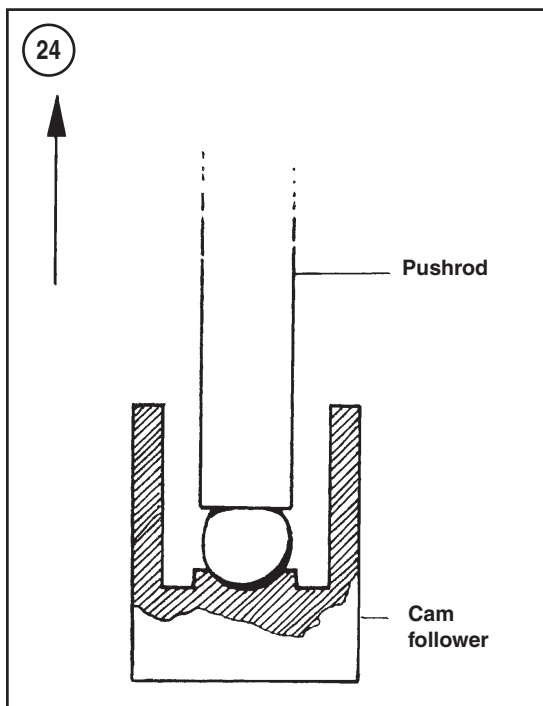
5. Examine the piston crown. The crown should not be worn or damaged. If the crown appears pecked or spongy-looking, also check the spark plug, valves and combustion chamber for aluminum deposits. If these deposits are found, the cylinder is suffering from excessive heat caused by a lean fuel mixture or preignition.

6. Inspect the intake tube (A, **Figure 22**) for cracks or other damage that would allow unfiltered air to enter the engine. Replace the intake tube O-ring (B, **Figure 22**) if it is excessively worn or damaged.

NOTE

If the engine is installed in the frame, do not install the intake manifold until after the cylinder head is installed on the engine.

7. Check the exhaust pipe studs (B, **Figure 21**) for damage. Replace the studs as described in Chapter One.
8. Inspect the combustion chamber (A, **Figure 21**) and exhaust port for cracks.
9. Place a straightedge across the gasket surface between the bolt holes (**Figure 23**). Measure warp



by inserting a feeler gauge between the straight-edge and cylinder head at each location. Measure warp between each set of bolt holes. **Table 2** specifies the maximum allowable warp. Warp or nicks in the cylinder head surface could cause an air leak and overheating. If the cylinder is warped, resurface or replace the cylinder head. Consult with a Honda dealership or a machine shop for this type of work.

10. Check the acorn nuts for thread damage. Discard the washers as new washers must be installed during installation.

11. To service the valves, refer to *Valves and Valve Components* in this chapter.

Cylinder Head Installation

1. Clean the cylinder head and cylinder mating surfaces of all gasket residue.
2. Install the two dowel pins (**Figure 18**) and a new cylinder head gasket. Note that the head gasket only fits properly in one direction.
3. Install the cylinder head. Be sure to seat the two dowel pins (**Figure 18**) and head gasket against the cylinder.
4. Lubricate the pushrod ends with engine oil, then install both pushrods (B, **Figure 16**) by seating them into the center of the cam follower grooves as shown in **Figure 24**.

NOTE

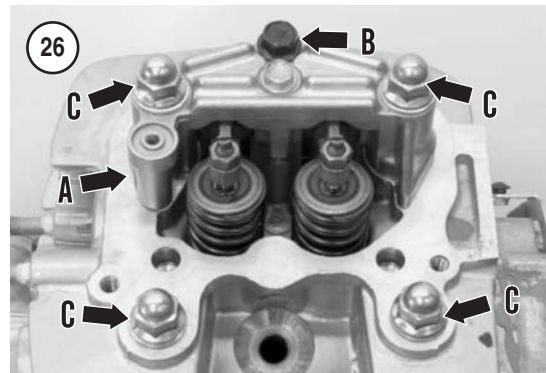
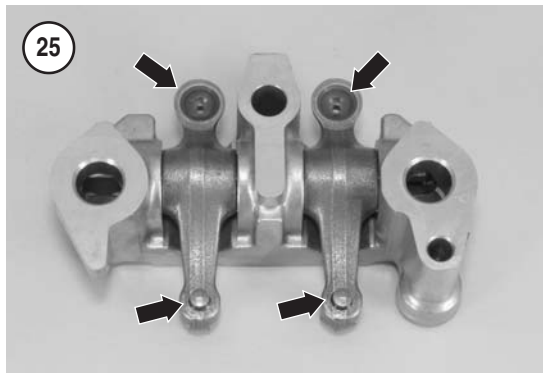
*When installing the original pushrods, make sure to install them in their original operating positions. Refer to the marks (**Figure 17**) made during removal.*

5. Install the two rocker arm holder dowel pins (A, **Figure 16**).
6. Loosen the two valve adjuster locknuts and loosen the adjusters (D, **Figure 19**).
7. If the engine was rotated after the pushrods and rocker arm holder were removed, reposition the engine at TDC by slowly pulling the recoil starter and aligning the flywheel T mark with the index mark on the rear crankcase cover (**Figure 13**).

CAUTION

The engine must remain at TDC while the pushrods, rocker arm holder and cylinder head nuts are installed and tightened.

8. Lubricate the rocker arm contact surfaces (**Figure 25**) with engine oil. Install the rocker arm holder (A, **Figure 26**) onto the crankcase studs. Push the rocker arm holder in place while positioning the two rocker arms onto the pushrod ends.
9. Lubricate the cylinder acorn head nuts, and the rocker holder bolt (B, **Figure 26**) with engine oil, then install them. Using a crossing pattern, tighten the cylinder acorn head nuts (C, **Figure 26**) to 39 N•m (29 ft.-lb.) and the rocker arm holder bolt to 30 N•m (22 ft.-lb.). Tighten them in 2-3 steps.
10. Install the 6 mm bolts (**Figure 27**) and tighten them to 12 N•m (106 in.-lb.).



11. Adjust the valve clearance as described in Chapter Three.

12. Reverse Steps 1-9 in the *Cylinder Head Removal* section to complete installation.

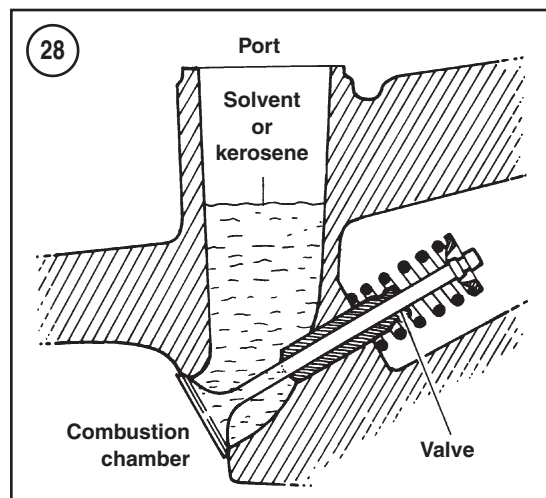
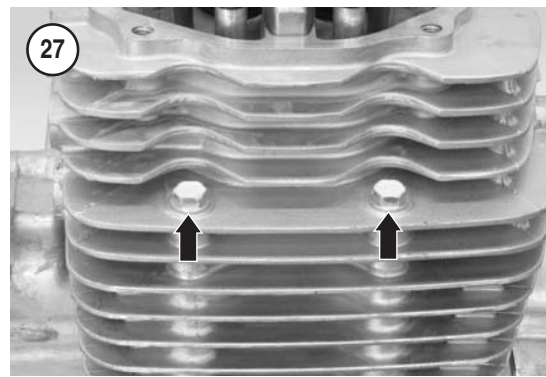
13. Tighten the upper engine hanger bolt to 54 N•m (40 ft.-lb.) and the upper engine hanger bracket bolts to 32 N•m (24 ft.-lb.).

VALVES AND VALVE COMPONENTS

A complete valve job, consisting of reconditioning the valve seats and replacing the valve guides, requires specialized tools and experience. This section describes service procedures on checking the valve components for wear and how to determine what type of service is required. Refer all valve service work requiring machine work and guide replacement to a Honda dealership.

Special Tools

A valve spring compressor is required to remove and install the valves. This tool compresses the valve springs so the valve keepers can be released from the valve stem. Do not attempt to remove or install the valves without a valve spring compressor. Because of the limited working area found in the typical ATV and motorcycle cylinder head, most automotive type valve spring compressors will not work. Instead, rent or purchase a valve spring compressor designed for ATV and motorcycle applications.



Solvent Test

For proper engine operation, the valves must seat tightly against their seats. Any condition that prevents the valves from seating properly can cause valve burning and reduced engine performance. Before removing the valves from the cylinder head, perform the following solvent test to check valve seating.

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